WHAT IS CLAIMED IS:

1. An exhaust emission control system for purifying exhaust gas emitted from at least one combustion chamber of an internal combustion engine, comprising:

an exhaust passage that comprises a first exhaust branch passage and a second exhaust branch passage, which join at downstream ends thereof into a common exhaust passage;

a first NOx catalyst disposed in the first exhaust branch passage;

a second NOx catalyst disposed in the second exhaust branch passage;

a particulate filter disposed in the common exhaust passage and located downstream of a joining point of the first exhaust branch passage and the second exhaust branch passage;

a first flow control valve that controls an amount of exhaust gas flowing through the first exhaust branch passage; and

a second flow control valve that controls an amount of exhaust gas flowing through the second exhaust branch passage, wherein

each of the first and second NOx catalysts stores NOx contained in the exhaust gas when an air/fuel ratio of the exhaust gas flowing into said each NOx catalyst is lean, and allows a reducing agent to reduce and remove the stored NOx when the air/fuel ratio of the exhaust gas flowing into said each NOx catalyst is rich; and

the particulate filter traps particulates contained in the exhaust gas, and oxidizes and removes the trapped particulates.

2. The exhaust emission control system according to claim 1, further comprising a controller that causes exhaust gas having a rich air/fuel ratio to flow from one of the first and second exhaust branch passages, and causes exhaust gas having a lean air/fuel ratio to flow from the other of the first and second exhaust branch passages, when a temperature of the particulate filter is required to be

raised

3. The exhaust emission control system according to claim 2, wherein when the temperature of the particulate filter is required to be raised, the controller causes exhaust gas having a rich air/fuel ratio to flow into the NOx catalyst disposed in the one of the first and second exhaust branch passages so that the exhaust gas having the rich air/fuel ratio flows from the one of the exhaust branch passages.

4. The exhaust emission control system according to claim 2, wherein the controller controls an average air/fuel ratio of exhaust gas flowing into the particulate filter to be lean so as to promote a function of the particulate filter to oxidize the particulates.

5. The exhaust emission control system according to claim 2, wherein the controller controls an average air/fuel ratio of exhaust gas flowing into the particulate filter to be lean so that the temperature of the particulate filter is raised to a level at which the particulates are oxidized and removed at a time.

6. The exhaust emission control system according to claim 2, wherein the controller controls an average air/fuel ratio of exhaust gas flowing into the particulate filter to be lean so that the temperature of the particulate filter is raised to a level at which the particulates burn out.

7. The exhaust emission control system according to claim 2, wherein:

the particulate filter has a NOx storage function; and

when it is required to release SOx from the particulate filter, the controller raises the temperature of the particulate filter to a level at which SOx is released from the particulate filter, and controls an average air/fuel ratio of exhaust gas flowing into the particulate filter to be rich or stoichiometric.

8. The exhaust emission control system according to claim 2, wherein the controller raises a temperature of one of the first and second NOx catalysts to which the exhaust gas having the rich air/fuel ratio is supplied, to a level at which SOx is released from the one of the NOx catalysts.

9. The exhaust emission control system according to claim 2, wherein:

the particulate filter has an oxidizing function, and the controller controls an average air/fuel ratio of exhaust gas flowing into the particulate filter to be lean; and

the controller raises a temperature of one of the first and second NOx catalysts to which the exhaust gas having the rich air/fuel ratio is supplied, to a level at which SOx is released from the one of the NOx catalysts, and keeps the temperature of the particulate filter equal to or lower than a level at which sulfate is formed.

10. The exhaust emission control system according to claim 2, wherein:

the particulate filter has an oxidizing function; and

the controller raises a temperature of one of the first and second NOx catalysts to which the exhaust gas having the rich air/fuel ratio is supplied, to a level at which SOx is released from the one of the NOx catalysts, and controls an average air/fuel ratio of exhaust gas flowing into the particulate filter to be lean or slightly lean.

11. The exhaust emission control system according to claim 1, further comprising:

a first fuel addition device disposed in the first exhaust branch passage and located upstream of the first NOx catalyst;

a second fuel addition device disposed in the second exhaust branch passage and located upstream of the second NOx catalyst; and

a controller that controls amounts of fuel injected from the first and second

fuel addition devices, respectively.

12. The exhaust emission control system according to claim 11, wherein:

the particulate filter has an oxidizing function; and

when it is required to release SOx from both of the first and second NOx catalysts, the controller controls at least one of the amounts of fuel injected from the first and second fuel addition devices and openings of the first and second flow control valves so that temperatures of the first and second NOx catalysts are raised to a level at which SOx is released from the NOx catalysts, rich gas is supplied to the first and second NOx catalysts, and an average air/fuel ratio of exhaust gas flowing into the particulate filter is controlled to be rich or stoichiometric.

13. The exhaust emission control system according to claim 10, wherein:

the particulate filter has a NOx storage function; and

when it is required to release SOx from the first and second NOx catalysts and release SOx from the particulate filter, the controller controls at least one of the amounts of fuel injected from the first and second fuel addition devices and openings of the first and second flow control valves so that temperatures of the first and second NOx catalysts are raised to a level at which SOx is released from the NOx catalysts, rich gas is supplied to the first and second NOx catalysts, a temperature of the particulate filter is raised to a level at which SOx is released from the particulate filter, and an average air/fuel ratio of exhaust gas flowing into the particulate filter is controlled to be rich or stoichiometric.

14. The exhaust emission control system according to claim 2, wherein:

the particulate filter has a NOx storage function; and

when it is required to release SOx from one of the first and second NOx catalysts and release SOx from the particulate filter, the controller raises a temperature of the one of the NOx catalysts to a level at which SOx is released from the NOx catalyst, raises the temperature of the particulate filter to a level at

which SOx is released from the particulate filter, and controls an average air/fuel ratio of exhaust gas flowing into the particulate filter to be rich or stoichiometric.

15. The exhaust emission control system according to claim 14, wherein the controller raises the temperature of the particulate filter to the level at which SOx is released from the particulate filter before raising the temperature of the one of the NOx catalysts to the level at which SOx is released from the NOx catalyst.

16. The exhaust emission control system according to claim 11, wherein the controller causes fuel to be injected from the first and second fuel addition devices before executing control of supplying rich gas to one of the first and second NOx catalysts and supplying lean gas to the other of the NOx catalysts so that an average air/fuel ratio of exhaust gas flowing into the particulate filter is controlled to be lean or stoichiometric.

17. The exhaust emission control system according to claim 1, further comprising a controller that supplies rich gas to at least one of the first and second NOx catalysts so that a temperature of the at least one NOx catalyst is raised to a level at which SOx is released, and then performs control of supplying rich gas to one of the first and second NOx catalysts and supplying lean gas to the other NOx catalyst after an amount of SOx released from the at least one NOx catalyst reaches a peak, so that a temperature of the particulate filter is raised to a level at which SOx is released from the particulate filter, and an average air/fuel ratio of exhaust gas flowing into the particulate filter is controlled to be rich or stoichiometric.

18. The exhaust emission control system according to claim 2, wherein when it is required to reduce and remove NOx from one of the first and second NOx catalyst to which the exhaust gas having the lean air/fuel ratio is supplied, the controller periodically supplies rich gas to the NOx catalyst.

19. The exhaust emission control system according to claim 2, wherein when a temperature of one of the first and second NOx catalysts to which the exhaust gas having the rich air/fuel ratio is supplied exceeds a permissible upper limit thereof, the controller reduces an opening of one of the first and second flow control valves corresponding to the one of the NOx catalysts, or increases an opening of the other of the flow control valves corresponding to the other NOx catalyst.

20. The exhaust emission control system according to claim 2, wherein the controller causes the exhaust gas having the rich air/fuel ratio and the exhaust gas having the lean air/fuel ratio to alternately flow from each of the first and second exhaust branch passages.

21. The exhaust emission control system according to claim 20, wherein the controller causes the exhaust gas having the rich air/fuel ratio and the exhaust gas having the lean air/fuel ratio to alternately flow from each of the first and second exhaust branch passages at predetermined time intervals.

22. The exhaust emission control system according to claim 20, wherein:

the controller causes exhaust gas having a rich air/fuel ratio to flow into the NOx catalyst disposed in the one of the first and second exhaust branch passages so that the exhaust gas having the rich air/fuel ratio flows from the one of the exhaust branch passages, and causes exhaust gas having a lean air/fuel ratio to flow into the NOx catalyst disposed in the other of the first and second exhaust branch passages so that the exhaust gas having the lean air/fuel ratio flows from the other exhaust branch passage; and

the controller causes the exhaust gas having the rich air/fuel ratio and the exhaust gas having the lean air/fuel ratio to alternately flow from each of the first and second exhaust branch passages so that a temperature of each of the first and

second NOx catalysts is kept equal to or lower than a predetermined temperature.

23. The exhaust emission control system according to claim 1, further comprising a controller that supplies rich gas to the first and second NOx catalysts so that a temperature of the particulate filter is raised to a fuel oxidation temperature, before executing control of supplying rich gas to one of the first and second NOx catalysts and supplying lean gas to the other NOx catalyst.

24. The exhaust emission control system according to claim 1, wherein the particulate filter has an oxidizing function, the exhaust emission control system further comprising a controller that:

periodically supplies rich gas to the particulate filter before executing control of supplying rich gas to one of the first and second NOx catalysts and supplying lean gas to the other NOx catalyst for controlling an air/fuel ratio of exhaust gas flowing into the particulate filter to be lean.

25. The exhaust emission control system according to claim 1, wherein the particulate filter has an oxidizing function, the emission exhaust control system further comprising a controller that:

when it is required to reduce and remove NOx at at least one of the NOx catalysts, periodically supplies rich gas to the at least one NOx catalyst, and controls an average air/fuel ratio of exhaust gas flowing into the particulate filter to be lean.

26. The exhaust emission control system according to claim 2, wherein the controller controls a proportion of an amount of the exhaust gas having the rich air/fuel ratio which flows from the one of the first and second exhaust branch passages to an amount of the exhaust gas having the lean air/fuel ratio which flows from the other exhaust branch passage so that the temperature of the particulate filter is kept equal to or lower than a predetermined temperature.

27. The exhaust emission control system according to claim 2, further comprising:

at least one fuel addition device mounted in at least one of the first and second exhaust branch passages and located upstream of at least one of the first and second NOx catalysts, wherein

the controller controls an air/fuel ratio of exhaust gas flowing from each of the first and second NOx catalysts by controlling at least one of an air/fuel ratio of exhaust gas emitted from the at least one combustion chamber, an amount of fuel injected from each of the at least one fuel addition device, and an opening of each of the first and second flow control valves, so as to control the temperature of the particulate filter.

28. The exhaust emission control system according to claim 1, wherein:

said at least one combustion chamber comprises two or more combustion chambers;

at least one of the combustion chambers is connected to the first exhaust branch passage, and a remaining one or more of the combustion chambers is connected to the second exhaust branch passage; and

an air/fuel ratio of exhaust gas that flows into the first exhaust branch passage and an air/fuel ratio of exhaust gas that flows into the second exhaust branch passage are controlled independently of each other.